

CLAIMS:

1. A variable loading rate method of starting a plurality of gas turbines used in a power plant for generating electricity comprising:

starting a first gas turbine and bringing it up to operate at a minimum load condition;

maintaining the first gas turbine at its minimum load condition while starting a second gas turbine and bringing it up to operate at its minimum load condition;

initiating start-up of a steam turbine to which the gas turbines are operationally coupled while maintaining both gas turbines at their minimum load conditions;

increasing the load on both gas turbines to a predetermined level greater than their minimum load levels once operating temperatures within the steam turbine reach predetermined levels; and,

subsequently loading both gas turbines as function of the load on the steam turbine to which the gas turbines are coupled, the starting sequence lowering the amount of NO₂ produced during start-up of the turbines and the occurrence of a visible yellow plume at the power plant.

2. The method of claim 1 in which the gas turbines are initially in a cold start condition.

3. The method of claim 1 in which the gas turbines are initially in a warm start condition.

4. The method of claim 1 in which the gas turbines are initially in a hot start condition.

5. The method of claim 1 in which starting the first gas turbine includes bringing it to a spinning reserve operating condition.

6. The method of claim 5 in which the second gas turbine is not started until the first gas turbine is at its spinning reserve condition.

7. The method of claim 6 further including start-up of the steam turbine when a rotor bore temperature of the steam turbine is at a first predetermined temperature.

5 8. The method of claim 7 in which the start-up of the steam turbine further requires a throttle pressure of the steam turbine to be at a minimum floor pressure level which varies depending upon whether the turbines are undergoing a cold start, warm start, or hot start.

10 9. The method of claim 8 further including bringing the steam turbine on-line and placing it in an inlet pressure control mode of operation.

10. The method of claim 9 further including placing inlet guide vanes of the first gas turbine to a minimum setting.

15 11. The method of claim 10 further including opening hot and cold reheat isolation valves for a heat recovery steam generator of the second gas turbine when the second gas turbine reaches its spinning reserve thereby to isolate the second gas turbine from the first gas turbine.

12. The method of claim 11 further including increasing the rotor bore temperature of the steam turbine to a second predetermined temperature.

20 13. The method of claim 12 further including opening high pressure isolation valves in the heat recovery steam generator of the second gas turbine when the rotor bore temperature in the second gas turbine reaches or exceeds its second predetermined temperature.

14. The method of claim 13 further including increasing both a high pressure rotor bore temperature and intermediate pressure rotor bore temperature of the steam

turbine to a predetermined temperature and loading both the first and second gas turbines to a predetermined load level at a predetermined loading rate.

15. The method of claim 14 in which the loading rate is a maximum loading rate for the gas turbines.

5 16. The method of claim 14 in which the loading on the first and second gas turbines is subsequently controlled at a rate determined by the load of the steam turbine.